

Appl. No. 09/810,387

In the Claims

Claims 1-29, 37, 38, 40-44, and 46 are pending in the application with claims 1, 9, 15, 27, and 41 amended, new claim 46 added, and claim 45 cancelled herein.

1. (currently amended) A chemical vapor deposition apparatus comprising:

a deposition chamber defined by a chamber lid and a chamber body having similar thicknesses, the chamber lid or body having an innermost surface inside the chamber and an outermost surface outside the chamber; and

a valve body having an entirety of a seat within the chamber lid or body thickness between the innermost and outermost surfaces of the chamber lid or body, the seat forming a part of the chamber lid or body.

2. (previously presented) The apparatus of claim 1 wherein the chemical vapor deposition apparatus comprises an atomic layer deposition apparatus.

3. (previously presented) The apparatus of claim 1 wherein the seat is within the chamber lid thickness.

4. (previously presented) The apparatus of claim 1 wherein the valve body includes a portion of the chamber lid or body as at least a part of the seat.

Appl. No. 09/810,387

5. (previously presented) The apparatus of claim 1 wherein the valve body comprises at least a part of a valve housing between the innermost and outermost surfaces of the chamber lid or body.

6. (previously presented) The apparatus of claim 5 wherein the valve body includes a portion of the chamber lid or body as at least a part of the valve housing.

7. (previously presented) The apparatus of claim 1 further comprising at least a part of a process chemical inlet to the valve body between the innermost and outermost surfaces of the chamber lid or body.

8. (previously presented) The apparatus of claim 7 wherein the chamber lid or body forms at least a part of the chemical inlet.

9. (currently amended) A chemical vapor deposition apparatus comprising:

a deposition chamber having a lid and a body with similar thicknesses;
a process chemical opening completely through the lid; and
~~an isolation mechanism proximate the chemical opening, the lid being integral to the isolation mechanism and the isolation mechanism selectively isolating the deposition chamber from receiving material through the chemical opening, the lid being integral to the isolation mechanism such that the isolation mechanism would be incomplete, nonfunctional, or otherwise not able to isolate material delivery from reaching the chamber absent the lid.~~

Appl. No. 09/810,387

10. (original) The apparatus of claim 9 wherein the chemical vapor deposition apparatus comprises an atomic layer deposition apparatus.

11. (original) The apparatus of claim 9 wherein the isolation mechanism comprises a valve.

12. (original) The apparatus of claim 11 wherein the lid comprises at least a part of a seat of the valve.

13. (original) The apparatus of claim 11 wherein the lid comprises at least a part of a housing of the valve.

14. (original) The apparatus of claim 11 wherein the lid comprises at least a part of a process chemical inlet to the valve.

Appl. No. 09/810,387

15. (currently amended) A chemical vapor deposition apparatus comprising:

a deposition chamber having a lid and a body with similar thicknesses defined in part by a cylindrical chamber body and a single-piece, removable lid with a circumference corresponding to a shape and a size of the chamber body where it joins with the lid, the chamber body size being selected to accommodate a semiconductor wafer during CVD when such wafer is parallel to the lid, the lid having a thickness which is much less than a width of the lid and which is similar to a thickness of the chamber body, the chamber body and lid thicknesses being selected to accommodate pressures associated with atomic layer deposition; and

a valve body including a portion of the lid as part of the valve body, the valve body selectively shutting off flow of a process chemical into the chamber, adjusting the flow rate of the chemical into the chamber, or both.

16. (original) The apparatus of claim 15 wherein the chemical vapor deposition apparatus comprises an atomic layer deposition apparatus.

17. (original) The apparatus of claim 15 wherein at a 50% open position as indicated by a stem position the valve body provides a flow rate of no more than about 50% of a maximum flow rate through the valve body.

18. (original) The apparatus of claim 15 wherein the portion of the lid comprises at least a part of a valve housing.

Appl. No. 09/810,387

19. (original) The apparatus of claim 18 wherein the part of the valve housing comprised by the portion of the lid is defined by a cylindrical opening in the lid, the valve body further comprising a stem coincident with a central axis of the cylindrical opening and positioned at least partially within the cylindrical opening.

20. (original) The apparatus of claim 15 wherein the portion of the lid comprises at least a part of a valve seat.

21. (original) The apparatus of claim 20 wherein the entirety of the valve seat is between an innermost surface of the lid inside the chamber and an outermost surface of the lid outside the chamber.

22. (original) The apparatus of claim 20 wherein the valve seat comprises a plug seat or a diaphragm seat.

23. (original) The apparatus of claim 20 wherein the part of the valve seat comprised by the portion of the lid is defined by a beveled lid surface around a cylindrical opening through the lid, the valve body further comprising a plug complementary to the beveled lid surface.

24. (original) The apparatus of claim 20 wherein the part of the valve seat comprised by the portion of the lid is defined by an annular platform around a cylindrical opening through the lid, the valve body further comprising a plug and a diaphragm between the plug and annular platform.

25. (original) The apparatus of claim 15 wherein the portion of the lid comprises at least a part of a process chemical inlet in the valve body.

Appl. No. 09/810,387

26. (original) The apparatus of claim 25 wherein the apparatus further comprises a process chemical inlet through the lid to the chemical inlet in the valve body.

27. (currently amended) A chemical vapor deposition apparatus comprising:

a deposition chamber having a lid and a body with similar thicknesses, the lid having an inner surface inside the chamber, an outer surface outside the chamber, and an opening completely through the lid thickness and defined by sidewalls forming a part of the lid and extending between the inner and outer surfaces;

a valve body having a housing and a seat;

at least a part of the housing comprising at least a part of the outer surface of the lid, at least a part of the opening sidewalls of the lid, or both; and

at least a part of the seat comprising at least a part of the inner surface of the lid, at least a part of the opening sidewalls of the lid, or both.

28. (original) The apparatus of claim 27 wherein the chemical vapor deposition apparatus comprises an atomic layer deposition apparatus.

29. (original) The apparatus of claim 27 further comprising a process chemical inlet to the valve body, a lid portion between the inner surface and the outer surface forming at least a part of the chemical inlet.

Claims 30-36 (cancelled).

Appl. No. 09/810,387

37. (previously presented) The apparatus of claim 1 wherein the chamber lid thickness is much less than a chamber lid width.

38. (previously presented) The apparatus of claim 9 wherein the chamber lid thickness is much less than a chamber lid width.

39. (cancelled).

40. (previously presented) The apparatus of claim 27 wherein the chamber lid thickness is much less than a chamber lid width.

41. (currently amended) A chemical vapor deposition apparatus comprising:

a deposition chamber having a lid defined in part by a chamber body and a single-piece, removable lid with a circumference corresponding to a shape and a size of the chamber body where it joins with the lid, the chamber body size being selected to accommodate a semiconductor wafer during CVD when such wafer is parallel to the lid, the lid having a thickness which is much less than a width of the lid and which is similar to a thickness of the chamber body, the chamber body and lid thicknesses being selected to accommodate pressures associated with atomic layer deposition;

a valve body including a portion of the lid as part of the valve body, the valve body being adapted to receive external control signals selectively shutting off flow of a process chemical into the chamber, adjusting the flow rate of the chemical into the chamber, or both; and

a valve stem that moves inward to the chamber to allow or to increase

Appl. No. 09/810,387

flow of process chemical into the chamber and moves outward from the chamber to shut off or to decrease process chemical flow into the chamber.

42. (previously presented) The apparatus of claim 41 wherein the portion of the lid comprises at least a part of a valve seat.

43. (previously presented) The apparatus of claim 42 wherein the part of the valve seat comprised by the portion of the lid is defined by a beveled lid surface around a cylindrical opening through the lid, the valve body further comprising a plug complementary to the beveled lid surface.

44. (previously presented) A chemical vapor deposition apparatus comprising:

a deposition chamber defined in part by a cylindrical body and a circular lid matched to a diameter of the cylindrical body;
an opening formed through a thickness of the lid, the opening defining at least a part of a valve seat;

a valve assembly positioned to match a valve plug or diaphragm with the valve seat; and

a distribution showerhead positioned to receive deposition gas from the opening when the valve assembly is in an open position.

45. (canceled).

Appl. No. 09/810,387

46. (new) A chemical vapor deposition apparatus comprising:
a deposition chamber defined in part by a cylindrical body and a single-piece, removable lid with a circumference corresponding to a shape and a size of the body where it joins with the lid, the body size being selected to accommodate a semiconductor wafer during CVD when such wafer is parallel to the lid, the lid having an inner surface inside the chamber and an outer surface outside the chamber and having a thickness which is much less than a width of the lid and which is similar to a thickness of the body, the body and lid thicknesses being selected to accommodate pressures associated with atomic layer deposition;
an opening completely through the lid thickness and defined by sidewalls forming a part of the lid and extending between the inner and outer surfaces, the sidewalls having a shape that of itself defines a valve seat, the entirety of the valve seat being positioned between the inner and outer surfaces; and
a valve assembly positioned to match a valve plug or diaphragm with the valve seat making the lid integral to the valve assembly such that the valve assembly would be incomplete, nonfunctional, or otherwise not able to isolate chemical delivery from reaching the chamber absent the lid.